

## **140h Transport of Gases through Nano Composites of Natural Rubber Latex Membranes**

*Ranimol Stephen and Sabu Thomas*

Abstract The gas permeability coefficient of nano filled natural rubber latex membranes has been investigated with special reference to type of filler, gases, filler loading and pressure. The layered silicates such as sodium bentonite and sodium fluorohectorite were the nanofillers used. Latex nanocomposites were characterized by X-ray diffraction technique. The dispersion of layered silicates in the polymer matrix was analysed using transmission electron microscopy. The effect of free volume on the gas barrier properties was investigated by positron annihilation spectroscopy. Due to the enhanced polymer/ filler interaction, the latex membranes reinforced with nano silicates exhibited lower permeability to oxygen and nitrogen gas. The higher reinforcement of layered silicates in latex membrane is associated with its platelet like morphology and high aspect ratio. The free volume in the latex membranes decreased in the presence of layered silicates and can be explained in terms of the confinement of the chain segments. The crosslink density of the filled samples was computed by equilibrium swelling method. The crosslink density values were found to be higher for layered silicates reinforced latex membranes supporting polymer/ filler interaction. It was observed that the oxygen /nitrogen selectivity of nano filled membranes were improved. The barrier property enhancement was observed upon the addition of layered silicates.